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Consultants and Engineers
(Geo-Tech & Road Materials Testing Laboratory)

#B9-003, GANGA, Jnanabharathi Enclave,
Valagerahalli, Mysore Road, Bangalore 560059
Ph: 9448853634, 8762194386.
Email: sapiencebangalore@gmail.com

Job No.: SCE/BBMP/RL/17/2020-2021

04.03.2021

Aggregate Impact Value

Client	**: Executive Engineer,** RR Naga Division,BBMP, Bangalore.
Agency	**: Sri. R Lokesh,** Contractor, Bangalore.
Name of the Work	Compreshensive development of roads and drains in Muthyalanagara, I.C-4A, Mohankumarnagara, Sundar nagara and surrounding areas in ward no-17 under PACKAGE-2019-20 RRN-DIV-(09)
BIS Code	:IS 2386(Part 4):1963
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	04.03.2021

Sl No.	Details	Test No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	380	382	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	87	89	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	293	293	
4	Aggregate Impact value = percent fines 100* (W_2/W_1) percent	22.89	23.30	**23.10**

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%(MORTH table no.500.16)

Note:

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ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

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Job No.: SCE/BBMP/RL/17/2021-2022

14.06.2021

Aggregate Impact Value

Client	**: Executive Engineer,** RR Nagar Division,BBMP, Bangalore.
Agency	**: Sri. R Lokesh,** Contractor, Bangalore.
Name of the Work	Compreshensive development of roads and drains in Muthyalanagara, LC-4A, Mohankumarnagara, Sundar nagara and surrounding areas in ward no-17 under PACKAGE-2019-20 RRN-DIV-(09)
BIS Code	:IS 2386(Part 4):1963
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	14.06.2021

Sl No.	Details	Test No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	384	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	83	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines			
	100* (W_2/W_1) percent	21.61	22.02	21.82

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%(MORTH table no.500.16)

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Job No.: SCE/BBMP/RL/17/2020-2021

04.03.2021

Aggregate Impact Value

Client	**: Executive Engineer,** RR Naga Division,BBMP, Bangalore.
Agency	**: Sri. R Lokesh,** Contractor, Bangalore.
Name of the Work	Compreshensive development of roads and drains in Muthyalanagara, LC-4A, Mohankumarnagara, Sundar nagara and surrounding areas in ward no-17 under PACKAGE-2019-20 RRN-DIV-(09)
BIS Code	:IS 2386(Part 4):1963
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	04.03.2021

Sl No.	Details	Test No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	383	385	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	83	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines 100* (W_2/W_1) percent	21.67	22.08	**21.87**

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%(MORTH table no.500.16)

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14.06.2021

Aggregate Impact Value

Client	**: Executive Engineer,** RR Nagar Division,BBMP, Bangalore.
Agency	**: Sri. R Lokesh,** Contractor, Bangalore.
Name of the Work	Compreshensive development of roads and drains in Muthyalanagara, LC-4A, Mohankumarnagara, Sundar nagara and surrounding areas in ward no-17 under PACKAGE-2019-20 RRN-DIV-(09)
BIS Code	:IS 2386(Part 4):1963
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	14.06.2021

Sl No.	Details	Test No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	386	388	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	82	80	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	304	308	
4	Aggregate Impact value = percent fines			
	100* (W_2/W_1) percent	21.24	20.62	**20.93**

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%(MORTH table no.500.16)

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Job No.: SCE/BBMP/RL/17/2021-2022

14.06.2021

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Executive Engineer,** RR Nagar Division,BBMP, Bangalore.
Agency	: **Sri. R Lokesh,** Contractor, Bangalore.
Name of Work	Compreshensive development of roads and drains in Muthyalanagara, LC-4A, Mohankumarnagara, Sundar nagara and surrounding areas in ward no-17 under PACKAGE-2019-20 RRN-DIV-(09)
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Bituminous Concrete
Date of Testing	14.06.2021

Sl no	Test	1	2	3	Requirements as per MORTH 5th edition table no 500.16
1	Flakiness Index	9.2	12.1	14.8	Combined Flakiness & Elongation index Max 35%
2	Elongation Index	13.5	13.5	10.6	
	Combined Flakiness & Elongation index	22.70	25.60	25.40	

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Job No.: SCE/BBMP/RL/17/2021-2022

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DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Executive Engineer,** RR Nagar Division,BBMP, Bangalore.
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Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Bituminous Concrete
Date of Testing	14.06.2021

Sl no	Test	1	2	3	Requirements as per MORTH 5th edition table no 500.16
1	Flakiness Index	13.5	10.6	9.6	Combined Flakiness & Elongation index Max 35%
2	Elongation Index	14.2	12.3	14.1	
.	Combined Flakiness & Elongation index	27.70	22.90	23.70	

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Job No.: SCE/BBMP/RL/17/2021-2022

16.06.2021

Specific Gravity And Water Absorption Test

Client	**: Executive Engineer,** RR Nagar Division,BBMP, Bangalore.
Agency	**: Sri. R Lokesh,** Contractor, Bangalore.
Name of the Work	Compreshensive development of roads and drains in Muthyalanagara, LC-4A, Mohankumarnagara, Sundar nagara and surrounding areas in ward no-17 under PACKAGE-2019-20 RRN-DIV-(09)
BIS Code	:IS 2386(Part 3):1963
Type of Mix	Bituminous Concrete
Date of Testing	14.06.2021 to 16.06.2021

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2018	2020	2021	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1263	1265	1266	
4	Weight of saturated surface dry aggregate in air	W_3 g	2014	2016	2017	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	751	751	751	
6	Weight of oven dried aggregate	W_4 g	2006	2008	2010	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.671	2.674	2.676	2.674
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.700	2.703	2.702	2.701
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.40%	0.40%	0.35%	0.38%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%(MORTH table 500.16)

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Job No.: SCE/BBMP/RL/17/2021-2022

16.06.2021

Specific Gravity And Water Absorption Test

Client	**: Executive Engineer,** RR Nagar Division,BBMP, Bangalore.
Agency	**: Sri. R Lokesh,** Contractor, Bangalore.
Name of the Work	Compreshensive development of roads and drains in Muthyalanagara, LC-4A, Mohankumarnagara, Sundar nagara and surrounding areas in ward no-17 under PACKAGE-2019-20 RRN-DIV-(09)
BIS Code	:IS 2386(Part 3):1963
Type of Mix	Bituminous Concrete
Date of Testing	14.06.2021 to 16.06.2021

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2021	2023	2024	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1266	1268	1269	
4	Weight of saturated surface dry aggregate in air	W_3 g	2012	2013	2015	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	746	745	746	
6	Weight of oven dried aggregate	W_4 g	2007	2009	2010	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.690	2.697	2.694	2.694
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.709	2.711	2.713	2.711
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.25%	0.20%	0.25%	0.23%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%(MORTH table 500.16)

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Job No.: SCE/BBMP/RL/17/2021-2022

Aggregate Gradation Test
IS : 2386 Part I

14.06.2021

Client	: Executive Engineer, RR Nagar Division,BBMP, Bangalore.
Agency	: Sri. R Lokesh, Contractor, Bangalore.
Name of the Work	Compreshensive development of roads and drains in Muthyalanagara, LC-4A, Mohankumarnagara, Sundar nagara and surrounding areas in ward no-17 under PACKAGE-2019-20 RRN-DIV-(09)
BIS Code	:IS 2386(Part 1):1963
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	14.06.2021

Total Weight of Sample: 5000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	362	7.24	7.24	92.76	90 - 100	
9.5	481	9.62	16.86	83.14	70 - 88	
4.75	629	12.58	29.44	70.56	53 - 71	
2.36	680	13.60	43.04	56.96	42 - 58	
1.18	538	10.76	53.80	46.20	34 - 48	
0.600	550	11.00	64.80	35.20	26 - 38	
0.300	489	9.78	74.58	25.42	18 - 28	
0.150	338	6.76	81.34	18.66	12 - 20	
0.075	471	9.42	90.76	9.24	4 - 10	

Total Weight of Sample: 5000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	428	8.56	8.56	91.44	90 - 100	
9.5	550	11.00	19.56	80.44	70 - 88	
4.75	676	13.52	33.08	66.92	53 - 71	
2.36	541	10.82	43.90	56.10	42 - 58	
1.18	573	11.46	55.36	44.64	34 - 48	
0.600	568	11.36	66.72	33.28	26 - 38	
0.300	678	13.56	80.28	19.72	18 - 28	
0.150	261	5.22	85.50	14.50	12 - 20	
0.075	325	6.50	92.00	8.00	4 - 10	

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14.06.2021

Aggregate Gradation Test
IS : 2386 Part I

Client	: Executive Engineer, RR Nagar Division,BBMP, Bangalore.
Agency	: Sri. R Lokesh, Contractor, Bangalore.
Name of the Work	Compreshensive development of roads and drains in Muthyalanagara, LC-4A, Mohankumarnagara, Sundar nagara and surrounding areas in ward no-17 under PACKAGE-2019-20 RRN-DIV-(09)
BIS Code	:IS 2386(Part 1):1963
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	14.06.2021

Total Weight of Sample: 5000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	345	6.90	6.90	93.10	90 - 100	
9.5	462	9.24	16.14	83.86	70 - 88	
4.75	658	13.16	29.30	70.70	53 - 71	
2.36	675	13.50	42.80	57.20	42 - 58	
1.18	545	10.90	53.70	46.30	34 - 48	
0.600	551	11.02	64.72	35.28	26 - 38	
0.300	479	9.58	74.30	25.70	18 - 28	
0.150	335	6.70	81.00	19.00	12 - 20	
0.075	484	9.68	90.68	9.32	4 - 10	

Total Weight of Sample: 5000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	352	7.04	7.04	92.96	90 - 100	
9.5	507	10.14	17.18	82.82	70 - 88	
4.75	602	12.04	29.22	70.78	53 - 71	
2.36	821	16.42	45.64	54.36	42 - 58	
1.18	580	11.60	57.24	42.76	34 - 48	
0.600	574	11.48	68.72	31.28	26 - 38	
0.300	689	13.78	82.50	17.50	18 - 28	
0.150	245	4.90	87.40	12.60	12 - 20	
0.075	336	6.72	94.12	5.88	4 - 10	

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Aggregate Gradation Test
IS : 2386 Part I

14.06.2021

Client	: Executive Engineer, RR Nagar Division,BBMP, Bangalore.
Agency	: Sri. R Lokesh, Contractor, Bangalore.
Name of the Work	Compreshensive development of roads and drains in Muthyalanagara, LC-4A, Mohankumarnagara, Sundar nagara and surrounding areas in ward no-17 under PACKAGE-2019-20 RRN-DIV-(09)
BIS Code	:IS 2386(Part 1):1963
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	14.06.2021

Total Weight of Sample: 5000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	356	7.12	7.12	92.88	90 - 100	
9.5	471	9.42	16.54	83.46	70 - 88	
4.75	652	13.04	29.58	70.42	53 - 71	
2.36	688	13.76	43.34	56.66	42 - 58	
1.18	540	10.80	54.14	45.86	34 - 48	
0.600	551	11.02	65.16	34.84	26 - 38	
0.300	479	9.58	74.74	25.26	18 - 28	
0.150	335	6.70	81.44	18.56	12 - 20	
0.075	484	9.68	91.12	8.88	4 - 10	

Total Weight of Sample: 5000 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Requirement as per MORTH table 500.17	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	350	7.00	7.00	93.00	90 - 100	
9.5	510	10.20	17.20	82.80	70 - 88	
4.75	658	13.16	30.36	69.64	53 - 71	
2.36	932	18.64	49.00	51.00	42 - 58	
1.18	580	11.60	60.60	39.40	34 - 48	
0.600	574	11.48	72.08	27.92	26 - 38	
0.300	425	8.50	80.58	19.42	18 - 28	
0.150	245	4.90	85.48	14.52	12 - 20	
0.075	336	6.72	92.20	7.80	4 - 10	

Note:

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⇒ Any Query regarding the report must be reported within 15 days from the date of testing.

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ಯಶವಂತಪುರ ಉಪ ವಿಭಾಗ
ಬೃಹತ್ ಬೆಂಗಳೂರು ಮಹಾನಗರ ಪಾಲಿಕೆ

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Email: sapiencebangalore@gmail.com

Job No.: SCE/BBMP/RL/17/2021-2022

Date: 17.06.2021

TEST REPORT ON STABILITY OF MIX

Client	:	**: Executive Engineer,** RR Nagar Division,BBMP, Bangalore.
Agency	:	**: Sri. R Lokesh,** Contractor, Bangalore.
Name of the Work	:	Compreshensive development of roads and drains in Muthyalanagara, LC-4A, Mohankumarnagara, Sundar nagara and surrounding areas in ward no-17 under PACKAGE-2019-20 RRN-DIV-(09)
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	17.06.2021

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.36	10.33	9 Kn (min)
2	Marshal flow, mm	3.98	2.42	2 – 4
3	Percent air voids in Mineral Aggregate	13.40	14.96	13 – 15
4	Voids in Compacted Mix	3.12	4.30	3 – 6
5	Percent Voids filled with Bitumen	66.33	69.19	65 - 75
6	Density, g/cc	2.26	2.27	--

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Job No.: SCE/BBMP/RL/17/2021-2022

Date: 17.06.2021

TEST REPORT ON STABILITY OF MIX

Client	:	: **Executive Engineer,** RR Nagar Division,BBMP, Bangalore.
Agency	:	: : **Sri. R Lokesh,** Contractor, Bangalore.
Name of the Work	:	Compreshensive development of roads and drains in Muthyalanagara, LC-4A, Mohankumarnagara, Sundar nagara and surrounding areas in ward no-17 under PACKAGE-2019-20 RRN-DIV-(09)
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	17.06.2021

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.01	10.88	9 Kn (min)
2	Marshal flow, mm	3.96	2.50	2 – 4
3	Percent air voids in Mineral Aggregate	13.34	14.71	13 – 15
4	Voids in Compacted Mix	3.71	4.62	3 – 6
5	Percent Voids filled with Bitumen	66.40	69.69	65 - 75
6	Density, g/cc	2.25	2.27	--

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Job No.: SCE/BBMP/RL/17/2021-2022 Date: 18.06.2021

TEST REPORT ON STABILITY OF MIX

Client	:	**: Executive Engineer,** RR Nagar Division,BBMP, Bangalore..
Agency	:	**: : Sri. R Lokesh,** Contractor, Bangalore.
Name of the Work	:	Compreshensive development of roads and drains in Muthyalanagara, LC-4A, Mohankumarnagara, Sundar nagara and surrounding areas in ward no-17 under PACKAGE-2019-20 RRN-DIV-(09)
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	18.06.2021

The results of the tests conducted on the Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.33	10.12	9 Kn (min)
2	Marshal flow, mm	3.96	2.48	2 – 4
3	Percent air voids in Mineral Aggregate	13.72	14.66	13 – 15
4	Voids in Compacted Mix	3.27	4.72	3 – 6
5	Percent Voids filled with Bitumen	66.69	69.30	65 - 75
6	Density, g/cc	2.26	2.27	--

Note:

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Job No: SCE/BBMP/RL/17/2021-2022

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE

19.06.2021

AASHTO T 164 & AASHTO T 30

CLIENT	: Executive Engineer, RR Nagar Division,BBMP, Bangalore.
AGENCY	: Sri. R Lokesh, Contractor, Bangalore.
NAME OF THE WORK	Compreshensive development of roads and drains in Muthyalanagara, LC-4A, Mohankumarnagara, Sundar nagara and surrounding areas in ward no-17 under PACKAGE-2019-20 RRN-DIV-(09)
SAMPLE ID	:Hot Mix Plant, Bangalore
DATE OF TESTING	19.06.2021

BITUMEN CONTENT DETERMINATION

Description	Sample 1	Sample 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	472	472.5
3. Weight of Asphalt and Mineral matter Extracted, g	28	27.5
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g	-	-
6. Weight of Bitumen Extracted, g. (corrected)	28	27.5
7. Bitumen content in %	5.60	5.50
8. Average	5.55	

GRADATION AFTER EXTRACTION

SIEVE SIZE mm	Test 1 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	15.7	15.7	3.3	96.7	90 - 100
9.5	65.1	80.8	17.1	82.9	70 - 88
4.75	92.3	173.1	36.7	63.3	53 - 71
2.36	45.8	218.9	46.4	53.6	42 - 58
1.18	40.6	259.5	55.0	45.0	34 - 48
0.600	52.1	311.6	66.0	34.0	26 - 38
0.300	47.9	359.5	76.2	23.8	18 - 28
0.150	32.1	391.6	83.0	17.0	12 - 20
0.075	46.9	438.5	92.9	7.1	4 - 10

SIEVE SIZE mm	Test 2 Weight Retained, gm	Cummulative Weight Retained	%Cummulative Retained	% Passing	Requirement as per MORTH table 500.17
19	0	0	0	100	100
13.2	15.6	15.6	3.3	96.7	90 - 100
9.5	62.3	77.9	16.5	83.5	70 - 88
4.75	98.9	176.8	37.4	62.6	53 - 71
2.36	46.1	222.9	47.2	52.8	42 - 58
1.18	40.8	263.7	55.8	44.2	34 - 48
0.600	50.1	313.8	66.4	33.6	26 - 38
0.300	47.8	361.6	76.5	23.5	18 - 28
0.150	32.6	394.2	83.4	16.6	12 - 20
0.075	49.8	444	94.0	6.0	4 - 10

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